CENPP-PL-CH

MARK D. SIIPOLA
(EX. 6463)

UMPQUA RIVER (GARDINER CHANNEL)
SEDIMENT QUALITY EVALUATION, 1989

Project

1. The Umpqua River and its tributaries are located 180 miles south of the Columbia River in Oregon's mid-coastal region (attachment 1). The Umpqua drainage area covers 4,560 square miles and yields 6,700,000 ac-ft of fresh water annually. The estuary covers approximately 6,430 acres, of which between 20% to 30% is tidelands, and is the third largest in Oregon (Percy, 1974). The mean tidal height at the mouth of the river is 6.9 feet above mean lower low water (mllw) with an extreme of 11.0 feet. Tidal water extends up to the town of Scottsberg (RM 27.5).

2. The U.S. Army Corps of Engineers is responsible for maintaining an entrance channel 26 feet deep and 200 feet wide; a river channel 22 feet deep and 200 feet wide to Reedsport (RM 11.9); and a turning basin at Reedsport 22 feet deep, 600 feet wide and 1,000 feet long. A side channel 12 feet deep and 100 feet wide extends into Winchester Bay with a mooring and turning basin 12 feet deep, 175 feet wide and 300 feet long located at its inner end. Another side channel 22 feet deep and 200 feet wide extends from RM 8.0 to Gardiner and includes a turning basin 500 feet wide and 800 feet long. This Gardiner side channel is the subject of this sediment quality evaluation.

3. Chemical and physical analyses of the potential dredge material was conducted to provide a technical evaluation of the material as required by Sections 401 and 404 of the Clean Water Act, USEPA guidelines (40 CFR 230) and USACE, Portland District current dredge material evaluation procedures. The evaluation prior to dredging is deemed necessary to determine if significant physical, chemical or biological impacts will result from dredging or disposal operations.

Previous Studies

4. Previous sampling efforts at various point within the estuary from November 1970 to August 1971 showed the following: (1) sediments contained 0.91 to 3.27 percent organic material; (2) sediment void ratios ranged between 0.77 and 0.97 and (3) the mean grain size indicated that sediments were predominately fine sands. In October 1980, samples were collected at 14 various locations for physical as well as bulk and elutriate chemical analysis from the Federal navigation channel. Additional sediment samples were collected at existing in-water disposal sites. The 1980 evaluation concluded that in-water disposal of dredged materials would not cause significant impacts.

5. An in-water disposal site used for disposal for sediments dredged from the Winchester Bay access channels was monitored in 1987/1988 to evaluate the effect of in-water disposal of material on the benthic community in the disposal area. This study showed an increase in the number of benthic invertebrates after disposal. The

primary increase was due to increases in polychaetes, with many different species showing an increase. Other taxa also showed increases.

Present Study

6. Sediment samples for physical and bulk chemical analyses were collected on February 23, 1989 at four locations along the Gardiner channel and in the turning basin (attachment 1). A vibra-core with transparent acid-rinsed cellulose butyrate acetate core liners was use to collect the samples. The recovered material was extruded from the core liners and a channel subsample was taken. Materials for physical analyses were placed in ziplock bags. Two cores (UR-VC-1A and UR-VC-2) contain layers of fine grained material. These layers were subsampled for chemical analysis as well as separate physical analysis. Samples for chemical analysis were placed in 8oz. I-Chem Specialty Cleaned Containers with teflon lined lids. All samples were placed in an ice chest for transport to the USACE NPDMT Laboratory for further processing.

7. With core number UR-VC-1 only 12 inches of material was recovered after driving the core 5 feet. This material was collected for physical analysis only. The site was resampled (UR-VC-1A) by driving the vibra-corer 7.5 feet with a recovery of 48 inches of material. A 5 inch thick clay layer between 36 to 41 inches deep was subsampled (UR-VC-1AA) for both physical and chemical analysis. At sample site UR-VC-2 a 27 inch core was recovered after driving 7 feet. Again a fine grained layer between 16 and 27 inches deep was subsampled for both physical and chemical analyses. At sample sites UR-VC-3 and UR-VC-4 a 7 foot penetration with the vibra-corer yielded recovery of 32 and 54 inches of material respectively. Due to the character of the material only physical analyses were conducted on these samples.

8. USACE NPDMT Laboratory conducted physical analyses on seven samples collected. These analyses included grain size as well as their standard "Dredge Analysis" which includes resuspended density, void ratio, volatile solids and specific gravity (attachment 2).

9. Chemical analyses were preformed by both USACE NPDMT Laboratory and Battelle Pacific NW Marine Laboratory. Analyses included metals, pesticides/PCBs, oil & grease, ammonia, TOC, PAH and phenols, including pentachlorophenol (attachment 3).

Discussion

10. Physical data: The material consists primarily of sandy material with fine grain and detrital material intermixed in layers 5 to 9 inches thick. The two layers of fines subsampled show percent fines in these layers to be 64.7 and 52.2%. The percent fines in the bulk of the material ranged from a high of 13.2% to a low of 6.4%. The percent volatile solids for the clay layers was 5.2% and 5.7% while that of the bulk of the material ranged from 2.0% to 3.7%.

11. Chemical data: None of the organic compounds for which analyses were preformed were detected in the samples tested. The concentrations of metals, oil & grease, TOC, and ammonia are also typical of clean estuarine sediments with a moderate level of organic matter.

Conclusions

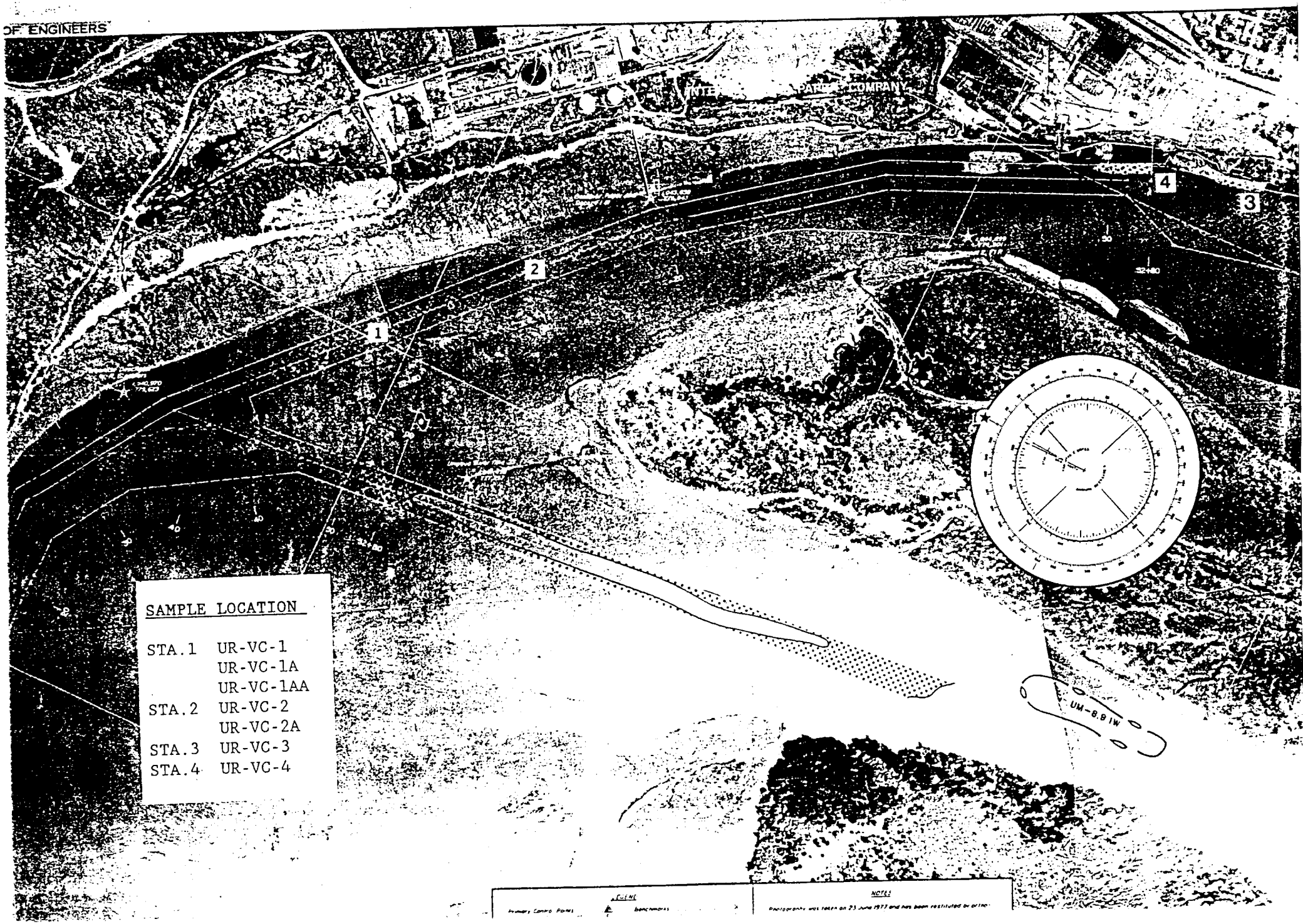
12. The sediments tested during this evaluation are considered representative of the Federal project sediments to be dredged. Unconfined in-water disposal of material dredged from the Gardiner channel and turning basin is not expected to cause significant impacts based upon the analyses outlined.

13. This sediment quality evaluation was completed by Mr. Mark D. Siipola, of the Coastal and Flood Plain Management Branch, Planing Division, USACE Portland District.

References

Percy, Katherine L. et al. "Description and Information Sources for Oregons Estuaries", Sea Grant College Program, Oregon State University Corvallis, 1974

ATTACHMENT 1


OF ENGINEERS
1
2
3
4
SAMPLE LOCATION
STA.1 UR-VC-1
UR-VC-1A
UR-VC-1AA
STA.2 UR-VC-2
UR-VC-2A
STA.3 UR-VC-3
STA.4 UR-VC-4
UM-8.8 IW
NOTES

ATTACHMENT 2

Rec'd 3/15/89

DEPARTMENT OF THE ARMY
NORTH PACIFIC DIVISION MATERIALS LABORATORY
CORPS OF ENGINEERS
1491 NW Graham Avenue
TROUTDALE, OREGON 97060-9503

CENPD-EN-G-L (1110-1-8100c) MAR 14 1989

MEMORANDUM FOR: Commander, Portland District, ATTN: CENPP-PL-CH

SUBJECT: W.O.#89-SHM-716, Report of Sediment Test Results

Project: GENERIC OCEAN DISPOSAL SITE (G.O.D.S.)
Intended Use: ---
Source of Material: Gardner Channel, Umpqua River
Submitted by: CENPP-PL-CH
Date Sampled: 23 Feb 89 Date Received: 24 Feb 89
Method of Test or Specification: ASTM, EM1110-2-1906
Reference: a) DA Form 2544, Order No. E86-89-0069, dated 29 Nov 88.
b) Our report, this subject, dated 28 Feb 89.

1. Enclosed are:

a. Enclosure 1, a-g, eight gradation analysis summary sheets with results for each sample.

b. Enclosure 2, one summary sheet, "Results of Physical Analyses of Sediment."

2. This completes all work to date.

Encls (dupe)

JAMES PAXTON
Director

Copy Furnished: CENPD-EN-G

* * * Corps of Engineers - North Pacific Division Materials Laboratory * * *

UMPQUA RIVER-GARDNER CHANNEL (GODS) (89-SHM-716)

Boring: -- Sample: UR-VC-1 Depth: -- Lab No.: 71687

Sieve Analysis

Sieve	Cumulative Grams Retained	Percent Passing
5 In.	0.00	100.0
2.5 In.	0.00	100.0
1.25 In.	0.00	100.0
5/8 In.	0.00	100.0
5/16 In.	0.00	100.0
No. 5	0.00	100.0
No. 10	0.00	100.0
Pan	73.70	0.0
No. 18	0.00	100.0
No. 35	0.10	99.9
No. 60	3.50	95.3
No. 120	51.70	29.9
No. 230	67.90	7.9
Pan	73.70	0.0

Hydrometer Analysis

Sample Weight:73.7 gr. Start Time:0000

Time	Temp (C)	Hydrometer Reading	Diameter in mm	Percent Finer
1	20.0	5.0	0.0527	7.4
3	20.0	4.8	0.0305	7.1
10	20.0	3.8	0.0168	5.8
100	20.0	1.9	0.0069	3.2
200	20.0	1.4	0.0049	2.6

D85: 0.22 D60: 0.17 D50: 0.15 D30: 0.13 D15: .091 D10: .075 mm

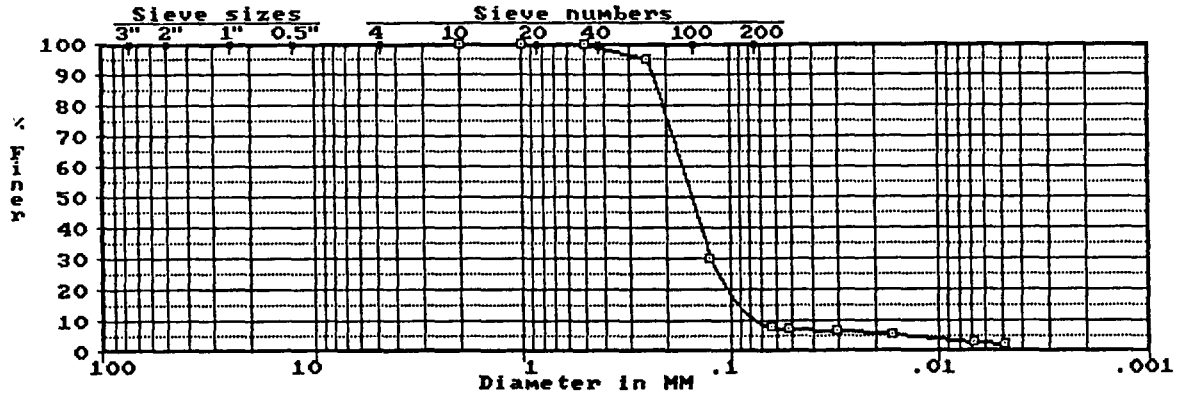
Cu: 2.26 Cc: 1.23

Gravel: 0.0% Sand: 90.0% Fines: 10.0%

Comments

- VIBRA-CORE SAMPLES

Cannot classify soil without knowing type of fines.



* * * Corps of Engineers - North Pacific Division Materials Laboratory * * *

UMPQUA RIVER-GARDNER CHANNEL (GODS) (89-SHM-716)

Boring: -- Sample: UR-VC-1A Depth: -- Lab No.: 71688

---- Sieve Analysis ------

Sieve	Cumulative Grams Retained	Percent Passing
5 In.	0.00	100.0
2.5 In.	0.00	100.0
1.25 In.	0.00	100.0
5/8 In.	0.00	100.0
5/16 In.	0.00	100.0
No. 5	0.00	100.0
No. 10	0.00	100.0
Pan	76.40	0.0
No. 18	0.00	100.0
No. 35	0.10	99.9
No. 60	2.00	97.4
No. 120	50.80	33.5
No. 230	68.00	11.0
Pan	76.40	0.0

---------- Hydrometer Analysis ----------

Sample Weight:76.4 gr. Start Time:0000

Time	Temp (C)	Hydrometer Reading	Diameter in mm	Percent Finer
1	20.0	7.8	0.0519	10.8
3	20.0	6.3	0.0302	8.8
10	20.0	4.8	0.0167	6.9
100	20.0	2.9	0.0069	4.4
200	20.0	2.4	0.0049	3.8

D85: 0.22 D60: 0.16 D50: 0.15 D30: 0.12 D15: .081 D10: .041 mm

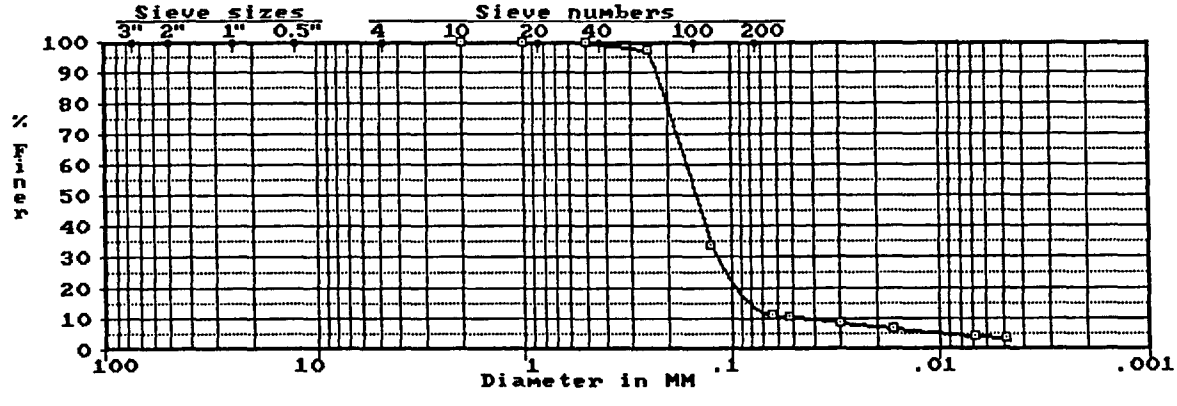
Cu: 4.06 Cc: 2.08

Gravel: 0.0% Sand: 86.8% Fines: 13.2%

---------- Comments ----------

- VIBRA-CORE SAMPLES

Cannot classify soil without knowing type of fines.



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UMPQUA RIVER-GARDNER CHANNEL (GODS) (89-SHM-716)

Boring: -- Sample: UR-VC-1AA Depth: -- Lab No.: 71689

Sieve Analysis

Sieve	Cumulative Grams Retained	Percent Passing
5 In.	0.00	100.0
2.5 In.	0.00	100.0
1.25 In.	0.00	100.0
5/8 In.	0.00	100.0
5/16 In.	0.00	100.0
No. 5	0.00	100.0
No. 10	0.00	100.0
Pan	32.50	0.0
No. 18	0.00	100.0
No. 35	0.10	99.7
No. 60	0.80	97.5
No. 120	8.80	72.9
No. 230	12.20	62.5
Pan	32.50	0.0

Hydrometer Analysis

Sample Weight:32.5 gr. Start Time:0000

Time	Temp (C)	Hydrometer Reading	Diameter in mm	Percent Finer
1	20.0	18.3	0.0489	57.3
3	20.0	15.8	0.0286	49.7
10	20.0	11.8	0.0161	37.5
100	20.0	5.9	0.0068	19.5
200	20.0	4.7	0.0048	15.8

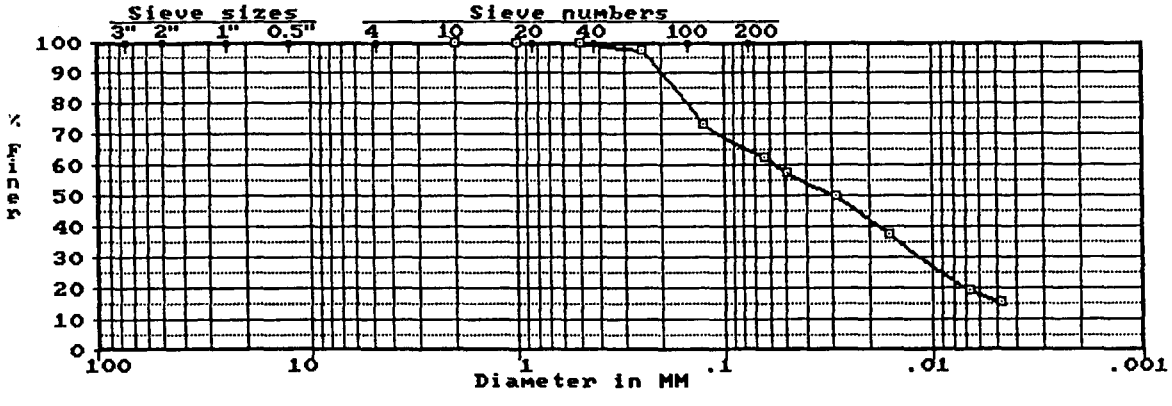
D85: 0.17 D60: .056 D50: .029 D30: .012 mm

Gravel: 0.0% Sand: 35.3% Fines: 64.7%

Comments

- VIBRA-CORE SAMPLES

Cannot classify soil without knowing type of fines.



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UMPQUA RIVER-GARDNER CHANNEL (GODS) (89-SHM-716)

Boring: -- Sample: UR-VC-2 Depth: -- Lab No.: 71690

------ Sieve Analysis ------

Sieve	Cumulative Grams Retained	Percent Passing
5 In.	0.00	100.0
2.5 In.	0.00	100.0
1.25 In.	0.00	100.0
5/8 In.	0.00	100.0
5/16 In.	0.00	100.0
No. 5	0.00	100.0
No. 10	0.00	100.0
Pan	80.20	0.0
No. 18	0.00	100.0
No. 35	0.10	99.9
No. 60	2.60	96.8
No. 120	54.30	32.3
No. 230	71.60	10.7
Pan	80.20	0.0

---------- Hydrometer Analysis ----------

Sample Weight:80.2 gr. Start Time:0000

Time	Temp (C)	Hydrometer Reading	Diameter in mm	Percent Finer
1	20.0	7.3	0.0521	9.6
3	20.0	6.8	0.0301	9.0
10	20.0	5.8	0.0166	7.8
100	20.0	2.9	0.0069	4.2
200	20.0	2.7	0.0049	4.0

D85: 0.22 D60: 0.17 D50: 0.15 D30: 0.12 D15: .082 D10: .057 mm

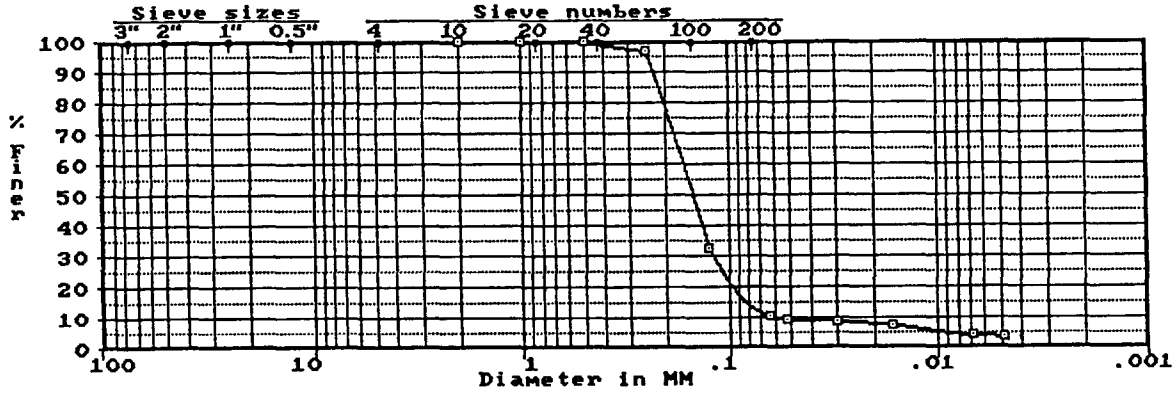
Cu: 2.90 Cc: 1.51

Gravel: 0.0% Sand: 87.1% Fines: 12.9%

---------- Comments ----------

- VIBRA-CORE SAMPLES

Cannot classify soil without knowing type of fines.



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UMPQUA RIVER-GARDNER CHANNEL (GODS) (89-SHM-716)

Boring: -- Sample: UR-VC-2A Depth: -- Lab No.: 71691

----- Sieve Analysis ------

Sieve	Cumulative Grams Retained	Percent Passing
5 In.	0.00	100.0
2.5 In.	0.00	100.0
1.25 In.	0.00	100.0
5/8 In.	0.00	100.0
5/16 In.	0.00	100.0
No. 5	0.00	100.0
No. 10	0.00	100.0
Pan	48.80	0.0
No. 18	0.00	100.0
No. 35	0.20	99.6
No. 60	1.50	96.9
No. 120	8.90	81.8
No. 230	27.70	43.2
Pan	48.80	0.0

---------- Hydrometer Analysis ----------

Sample Weight:48.8 gr. Start Time:0000

Time	Temp (C)	Hydrometer Reading	Diameter in mm	Percent Finer
1	20.0	18.8	0.0487	39.2
3	20.0	15.8	0.0286	33.1
10	20.0	11.8	0.0161	25.0
100	20.0	6.9	0.0067	15.0
200	20.0	5.4	0.0048	12.0

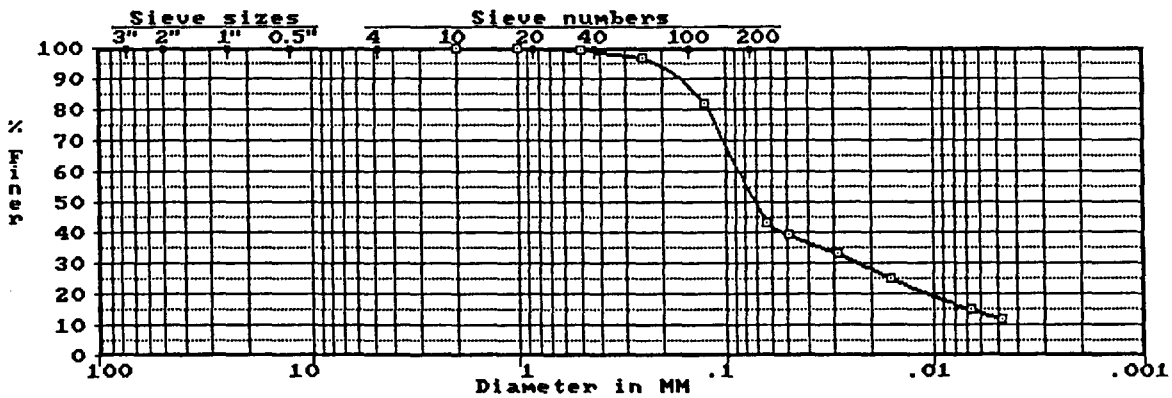
D85: 0.14 D60: .087 D50: .072 D30: .023 D15: .0067 mm

Gravel: 0.0% Sand: 47.8% Fines: 52.2%

---------- Comments ----------

- VIBRA-CORE SAMPLES

Cannot classify soil without knowing type of fines.



* * * Corps of Engineers - North Pacific Division Materials Laboratory * * *

UMPQUA RIVER-GARDNER CHANNEL (GODS) (89-SHM-716)

Boring: -- Sample: UR-VC-3 Depth: -- Lab No.: 71692

--- Sieve Analysis ------

Sieve	Cumulative Grams Retained	Percent Passing
5 In.	0.00	100.0
2.5 In.	0.00	100.0
1.25 In.	0.00	100.0
5/8 In.	0.00	100.0
5/16 In.	0.00	100.0
No. 5	0.40	100.0
No. 10	0.60	99.9
Pan	1157.10	0.0
No. 18	0.00	99.9
No. 35	1.50	97.9
No. 60	43.80	39.4
No. 120	65.70	9.1
No. 230	68.30	5.5
Pan	72.30	0.0

---------- Hydrometer Analysis ----------

Sample Weight:72.3 gr. Start Time:0000

Time	Temp (C)	Hydrometer Reading	Diameter in mm	Percent Finer
1	20.0	3.3	0.0532	5.2
3	20.0	3.0	0.0308	4.8
10	20.0	2.3	0.0169	3.8
100	20.0	1.9	0.0069	3.3
200	20.0	0.9	0.0049	1.9

D85: 0.42 D60: 0.31 D50: 0.28 D30: 0.21 D15: 0.15 D10: 0.13 mm

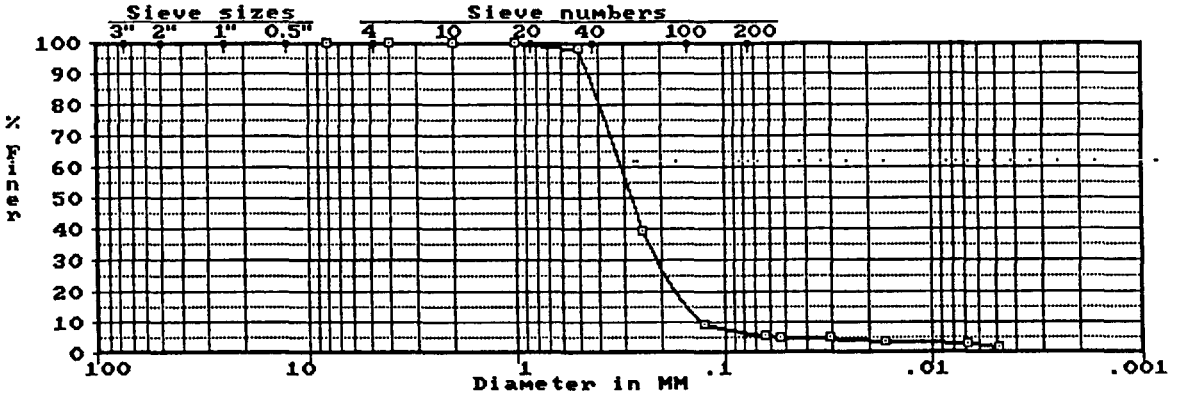
Cu: 2.42 Cc: 1.12

Gravel: 0.0% Sand: 93.6% Fines: 6.4%

---------- Comments ----------

- VIBRA-CORE SAMPLES

Cannot classify soil without knowing type of fines.



* * * Corps of Engineers - North Pacific Division Materials Laboratory * * *

UMPQUA RIVER-GARDNER CHANNEL (GODS) (89-SHM-716)

Boring: -- Sample: UR-VC-4 Depth: -- Lab No.: 71693

----- Sieve Analysis ------

Sieve	Cumulative Grams Retained	Percent Passing
5 In.	0.00	100.0
2.5 In.	0.00	100.0
1.25 In.	0.00	100.0
5/8 In.	0.00	100.0
5/16 In.	0.00	100.0
No. 5	1.90	99.6
No. 10	2.60	99.4
Pan	456.40	0.0
No. 18	0.00	99.4
No. 35	0.60	98.8
No. 60	33.70	63.1
No. 120	71.80	22.0
No. 230	82.70	10.2
Pan	92.20	0.0

---------- Hydrometer Analysis ----------

Sample Weight:92.2 gr. Start Time:0000

Time	Temp (C)	Hydrometer Reading	Diameter in mm	Percent Finer
1	20.0	8.8	0.0516	9.9
3	20.0	7.8	0.0300	8.9
10	20.0	5.8	0.0166	6.7
100	20.0	3.9	0.0068	4.7
200	20.0	3.4	0.0049	4.2

D85: 0.36 D60: 0.24 D50: 0.20 D30: 0.15 D15: .097 D10: .055 mm

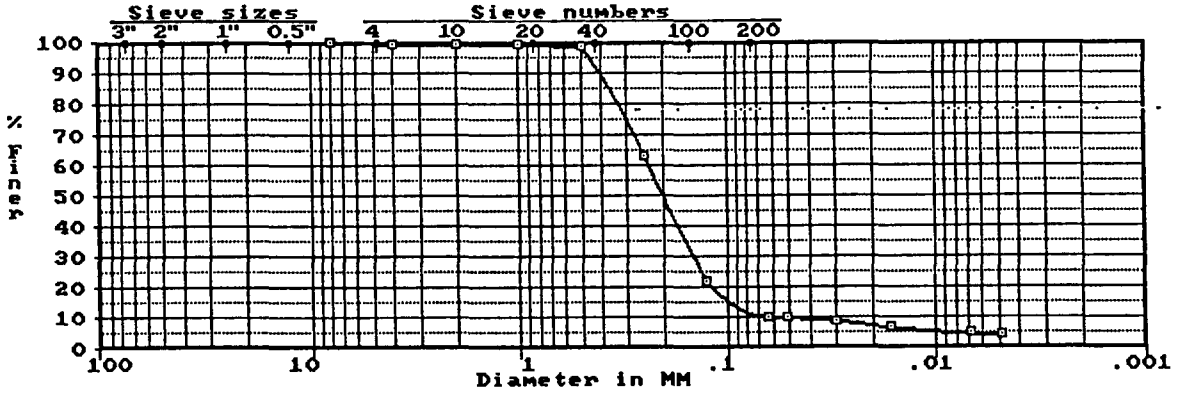
Cu: 4.33 Cc: 1.61

Gravel: 0.3% Sand: 88.6% Fines: 11.1%

---------- Comments ----------

- VIBRA-CORE SAMPLES

Cannot classify soil without knowing type of fines.



UMPQUA RIVER - GARDNER CHANNEL (GODS)

Results of Physical Analyses of Sediment

CENPP Sample No.	Resuspended Density, gms/L	Void Ratio	Volatile Solids, %	Specific Gravity	Particle Roundness Grading
UR-VC-1	1693	1.441	2.3	2.69	Subangular to subround
UR-VC-1A	1659	1.567	2.0	2.69	" " "
UR-VC-1AA	1418	3.032	5.2	2.69	" " "
UR-VC-2	1627	1.709	2.6	2.70	Angular to subangular
UR-VC-2A	1399	3.156	5.7	2.66	Subangular to subround
UR-VC-3	1736	1.300	2.0	2.69	" " "
C-4	1603	1.766	3.7	2.67	" " "

Received : 24 Feb 89

ATTACHMENT 3

NPD

Rec'd 3/23/89

CHAIN OF CUSTODY RECORD

PROJECT: Umpqua River - Gardner Channel ~~Umpqua Bay - Off Pg~~

SAMPLERS: (Signature) Mark Siipola / Mark Hanson / Mark Korsness

SAMPLE NUMBER	DATE	TIME	COMP.	GRAB	NO. CONTAINERS	Metals *	Pesticides/PCB's	Oil + Grease	Ammonia	TOC	8100 - PAHs	8120 - Chlorinated Hydrocarbons	6060 - Phthalate Esters	Phenols	REMARKS OR SAMPLE LOCATION	PRESERVATION: ICED	PRESERVATION: SPECIFY CHEMICALS ADDED AND FINAL pH IF KNOWN
UR-VC-1AA	2/23/89	9:31			1	X	X	X	X	X	X			X	Clay layer 25" thick 36"-41" deep	✓	None
~~UR-VC-1AA~~															~~11" thick 78"-89" deep~~	~~✓~~	~~None~~
UR-VC-2A	"	1005			1	X	X	X	X	X	X			X	Clay layer 11" thick 16"-17" deep	✓	None

Relinquished by: (Signature) ①	Date / Time	Received by: (Signature)	Relinquished by: (Signature) ④	Date / Time	Shipped via:
M D Siipola	2/24/89 1232	Joan Vanden Akker			
Relinquished by: (Signature) ②	**Date / Time**	**Received by: (Signature)**	**Received for Laboratory by: (Signature)**	**Date / Time**	**Shipping Ticket No.**
Joan Vanden Akker	2/24/89 1330	2-25-89 10:30			
Relinquished by: (Signature) ③	Date / Time	Received by: (Signature)	Remarks * Metals: As, Cd, Cr, Cu, Pb, Hg, Ni, Zn		
			Detection Limits 1.0 0.1 1.0 1.0 1.0 .02 1.0 1.0 (mg/kg dry weight)		

Enclosure 3

DEPARTMENT OF THE ARMY
NORTH PACIFIC DIVISION MATERIALS LABORATORY
CORPS OF ENGINEERS
1491 NW Graham Avenue
TROUTDALE, OREGON 97060 -9503

MAR 22 1989

CENPD-EN-G-L (1110-1-8100c)

MEMORANDUM FOR: Commander, Portland District, ATTN: CENPP-PL-CH

SUBJECT: W.O.#89-SHM-716, Report of Chemical Analyses

Project: UMPQUA RIVER - GARDNER CHANNEL
Intended Use: Evaluate condition of site
Source of Material: Above site
Submitted by: CENPP-PL-CH
Date Sampled: 23 Feb 89 Date Received: 24 Feb 89
Method of Test or Specification: See enclosures
Reference: DA Form 2544, Order No. E86-89-0069, dated 29 Nov 88.

1. Enclosed are results of analyses performed by CENPD-EN-G-L on two samples from the above site. Included are:

a. Enclosure 1, Organochlorine Pesticides and PCB's Analyses, with associated Quality Control (QC).

b. Enclosure 2, Inorganic Analyses, with associated QC.

c. Enclosure 3, completed Chain of Custody Record.

2. Two samples were received for testing. The samples were split, and representative fractions of each sample were sent to Battelle Marine Research Laboratory for analyses. The remaining fraction was analyzed in-house for Quality Assurance.

3. Battelle's results are to be reported directly to CENPP-PL-CH.

4. This completes all work requested.

JAMES PAXTON
Director

Encls (dupe)

Copy Furnished: CENPD-EN-G

UMPQUA RIVER - GARDNER CHANNEL

Organochlorine Pesticides and PCB's

Sample Identification: UR-VC-1AA
Reporting Units: ug/kg (ppb), dry weight
% Solids: 60

Sample Matrix: sediment
GC Analysis: 20 Mar 89
Collected: 23 Feb 89
Extracted: 28 Feb 89

Analyte	Result	Detection Limit
Aldrin	<5.0	5.0
alpha-BHC	<5.0	5.0
beta-BHC	<5.0	5.0
gamma-BHC	<5.0	5.0
delta-BHC	<5.0	5.0
Chlordane	<20.0	20.0
4,4'-DDD	<5.0	5.0
4,4'-DDE	<5.0	5.0
4,4'-DDT	<5.0	5.0
Dieldrin	<5.0	5.0
Endosulfan I	<5.0	5.0
Endosulfan II	<5.0	5.0
Endosulfan sulfate	<5.0	5.0
Endrin	<5.0	5.0
Endrin aldehyde	<5.0	5.0
Heptachlor	<5.0	5.0
Heptachlor epoxide	<5.0	5.0
Methoxychlor	<5.0	5.0
Toxaphene	<50.0	50.0
Aroclor-1016	<40.0	40.0
Aroclor-1221	<40.0	40.0
Aroclor-1232	<40.0	40.0
Aroclor-1242	<40.0	40.0
Aroclor-1248	<40.0	40.0
Aroclor-1254	<40.0	40.0
Aroclor-1260	<40.0	40.0

Methods

Test Methods for Evaluating Solid Waste," SW-846, 3rd Edition, U.S. EPA, November, 1986:

Method 3540, Soxhlet Extraction
Method 3660, Sulfur Cleanup
Method 8080, Organochlorine Pesticides and PCB's

UMPQUA RIVER - GARDNER CHANNEL

Organochlorine Pesticides and PCB's

Sample Identification: UR-VC-2A
Reporting Units: ug/kg (ppb), dry weight
% Solids: 61

Sample Matrix: sediment
GC Analysis: 20 Mar 89
Collected: 23 Feb 89
Extracted: 28 Feb 89

Analyte	Result	Detection Limit
Aldrin	<5.0	5.0
alpha-BHC	<5.0	5.0
beta-BHC	<5.0	5.0
gamma-BHC	<5.0	5.0
delta-BHC	<5.0	5.0
Chlordane	<20.0	20.0
4,4'-DDD	<5.0	5.0
4,4'-DDE	<5.0	5.0
4,4'-DDT	<5.0	5.0
Dieldrin	<5.0	5.0
Endosulfan I	<5.0	5.0
Endosulfan II	<5.0	5.0
Endosulfan sulfate	<5.0	5.0
Endrin	<5.0	5.0
Endrin aldehyde	<5.0	5.0
Heptachlor	<5.0	5.0
Heptachlor epoxide	<5.0	5.0
Methoxychlor	<5.0	5.0
Toxaphene	<50.0	50.0
Aroclor-1016	<40.0	40.0
Aroclor-1221	<40.0	40.0
Aroclor-1232	<40.0	40.0
Aroclor-1242	<40.0	40.0
Aroclor-1248	<40.0	40.0
Aroclor-1254	<40.0	40.0
Aroclor-1260	<40.0	40.0

Methods

Test Methods for Evaluating Solid Waste," SW-846, 3rd Edition, U.S. EPA, November, 1986:

Method 3540, Soxhlet Extraction
Method 3660, Sulfur Cleanup
Method 8080, Organochlorine Pesticides and PCB's

UMPQUA RIVER - GARDNER CHANNEL

Organochlorine Pesticides and PCB's

Sample Identification: Method Blank
Reporting Units: ug/kg (ppb), dry weight

Sample Matrix: sediment GC Analysis: 20 Mar 89
Comments: Results calculated for sample size of ten grams.

Analyte	Result	Detection Limit
Aldrin	<5.0	5.0
alpha-BHC	<5.0	5.0
beta-BHC	<5.0	5.0
gamma-BHC	<5.0	5.0
delta-BHC	<5.0	5.0
Chlordane	<20.0	20.0
4,4'-DDD	<5.0	5.0
4,4'-DDE	<5.0	5.0
4,4'-DDT	<5.0	5.0
Dieldrin	<5.0	5.0
Endosulfan I	<5.0	5.0
Endosulfan II	<5.0	5.0
Endosulfan sulfate	<5.0	5.0
Endrin	<5.0	5.0
Endrin aldehyde	<5.0	5.0
Heptachlor	<5.0	5.0
Heptachlor epoxide	<5.0	5.0
Methoxychlor	<5.0	5.0
Toxaphene	<50.0	50.0
Aroclor-1016	<40.0	40.0
Aroclor-1221	<40.0	40.0
Aroclor-1232	<40.0	40.0
Aroclor-1242	<40.0	40.0
Aroclor-1248	<40.0	40.0
Aroclor-1254	<40.0	40.0
Aroclor-1260	<40.0	40.0

Methods

Test Methods for Evaluating Solid Waste," SW-846, 3rd Edition, U.S. EPA, November, 1986:

Method 3540, Soxhlet Extraction
Method 8080, Organochlorine Pesticides and PCB's

UMPQUA RIVER - GARDNER CHANNEL

Organochlorine Pesticides and PCB's

Matrix Spike Results

Sample Identification: UR-VC-1AA
Reporting Units: ug/kg (ppb), dry weight

Analyte	Spike Added	Spike Result	Sample Result	Percent Recovered
alpha-BHC	79	85	<5.0	107.6
gamma-BHC	79	60	<5.0	75.9
Aroclor-1254	790	1090	<40.0	138.0

CENPD-EN-G-L (89-SHM-716)

UMPQUA RIVER - GARDNER CHANNEL

Inorganic Chemical Analyses

Sample Matrix: sediment
Sample Identification: UR-VC-1AA
Moisture Contemt. %: 40
Reporting Units: mg/Kg (ppm), dry wt. basis
Collected: 23 Feb 89 (0931)
Received: 24 Feb 89 (1232)
3050 Digestion: 27 Feb 89
Sample Description: Clayey silt
Comments:

Parameter	Result	Analysis Complete
Ammonia, as N	25	28 Feb 89
Metals:		
arsenic, total	18.1	4 Apr 89
cadmium, total	<0.01	14 Mar 89
chromium, total	57.1	15 Mar 89
copper, total	45.0	7 Mar 89
lead, total	8.5	5 Apr 89
mercury, total	0.27	6 Mar 89
nickel, total	53.7	17 Mar 89
zinc, total	92	2 Mar 89

Enclosure 2

UMPQUA RIVER - GARDNER CHANNEL

Inorganic Chemical Analyses

Sample Matrix: sediment
Moisture Contemt. %: 39
Collected: 23 Feb 89 (1005)
3050 Digestion: 27 Feb 89
Sample Identification: UR-VC-2A
Reporting Units: mg/Kg (ppm), dry wt. basis
Received: 24 Feb 89 (1232)
Sample Description: Clayey silt
Comments: _____

Parameter	Result	Analysis Complete
Ammonia, as N	25	28 Feb 89
Metals:		
arsenic, total	15.6	4 Apr 89
cadmium, total	<0.01	14 Mar 89
chromium, total	46	15 Mar 89
copper, total	31.8	7 Mar 89
lead, total	8.4	5 Apr 89
mercury, total	0.24	6 Mar 89
nickel, total	45.7	17 Mar 89
zinc, total	79	2 Mar 89

UMPQUA RIVER - GARDNER CHANNEL

Inorganic Chemical Analyses
Quality Control - Spiked Sample

Sample Matrix: sediment Reporting Units: mg/Kg (ppm), dry wt. basis
Sample Identification: UR-VC-2AA
Comments: Results have been calculated on a dry weight basis to facilitate comparison with reported samples values.

Trace Metal	Spiked Sample Result	Sample Result	Spike Added	Recovery, %
arsenic, total	35.2	18.1	20	86
cadmium, total	4.8	<0.01	5	96
copper, total	67.0	45.0	20	110
lead, total	25.6	8.5	20	86
mercury, total	1.0	0.27	1	73
zinc, total	110	92.0	20	90

UMPQUA RIVER - GARDNER CHANNEL

Inorganic Chemical Analyses
Quality Control - Process Blanks

Reporting Units: mg/L

Matrix: Method 3050 Digestion

Trace Metal	Result
arsenic	<0.01
cadmium	<0.001
chromium	<0.01
copper	<0.01
lead	<0.01
mercury	<0.0002
nickel	<0.01
zinc	0.04

UMPQUA RIVER - GARDNER CHANNEL

Inorganic Chemical Analyses
Quality Control - Analyses of Reference Material

Sample Identification: EPA QC Samples - WP 287 for metals; WP 987, conc. 1, and EPA Municipal Sludge for ammonia

Parameter	Result	Units	True Value	Recovery, %
Ammonia, as N				
WP 987, conc. 1	4.0	mg/L	4.0	100
Municipal Sludge	1,100	mg/Kg	*	68
Trace Metals:				
arsenic	52.3	ug/L	50	105
cadmium	4.5	ug/L	5.0	90
chromium	28.7	ug/L	25	115
copper	45	ug/L	50	90
lead	49.6	ug/L	50	99
mercury	3.15	ug/L	2.5	126
nickel	20	ug/L	20	100
zinc	262	ug/L	200	131

* A median value of 1620 mg/Kg and 95-percent confidence interval of 977 - 2260 mg/kg were furnished by USEPA, along with the municipal sludge sample.

UMPQUA RIVER - GARDNER CHANNEL

Inorganic Chemical Analyses
Summary of Test Methods

USEPA, "Test Methods for Evaluating Solid Waste," Third Edition, SW-846, November 1986:

Method 3050, digestion (for metals analyses)	: acid digestion of sediment, sludges and soils
Method 7060, arsenic	: atomic absorption, furnace
Method 7131, cadmium	: atomic absorption, furnace
Method 7191, chromium	: atomic absorption, furnace
Method 7210, copper	: atomic absorption, direct aspiration
Method 7421, lead	: atomic absorption, furnace
Method 7471, mercury	: atomic absorption, manual cold vapor
Method 7950, zinc	: atomic absorption, direct aspiration

USEPA, "Methods for Chemical Analysis of Water and Wastes," EPA-600/4-79-202, March 1982:

Method 249.2, nickel	: atomic absorption, furnace
Method 350.3, nitrogen, ammonia	: potentiometric, ion selective electrode

UMPQUA RIVER - GARDNER CHANNEL

Inorganic Chemical Analyses
Detection Limits

Parameter	Detection Limits Required: 3050 Digestate, ug/L	Detection Limits Required: Sample, dry wt. basis, mg/Kg	Instrumental
Ammonia, as N			0.03 mg/Kg
Trace Metals:			
arsenic	10	1.0	0.77 ug/L*
cadmium	1	0.1	0.10 ug/L*
chromium	10	1.0	0.74 ug/L*
copper	10	1.0	1 ug/L (approx.)
lead	10	1.0	0.83 ug/L*
mercury	0.2	0.02	0.2 ug/L (approx.)
nickel	10	1.0	1 ug/L (approx.)
zinc	10	1.0	5 ug/L (approx.)

* Instrumental detection limit (IDL) was determined by a series of analyses ending 24 Jan 89 and calculated according to the following formula:

$$IDL = \frac{\text{standard code. X 2 (average of 3 std. deviations)}}{\text{mean}}$$

Rec'd 4/3/89
Siipola

Battelle
Pacific Northwest Division
Marine Sciences Laboratory
439 West Sequim Bay Road
Sequim, Washington 98382
(206) 683-4151

March 30, 1989

Mr. Mark Siipola
U.S. Army Corps of Engineers
P.O. Box 2946, Attn: PL-AP
Portland, Oregon 97208

Dear Mark:

Recently Pacific Northwest Laboratory (Battelle-Northwest) conducted chemical analyses of sediments from the Portland District dredging project, Umpqua River, Gardner Channel, collected by your organization. Battelle received, in good condition, on February 28, 1989, two sediment samples from the COE Troutdale Laboratory. The sediment samples were taken from clay layers in sediment cores. Sample UR-VC-IAA was a clay layer 25 inches thick from a depth of 36 to 41 inches and sample UR-VC-2A was 11 inches thick and 16 to 17 inches deep. These two samples were analyzed for metals (As, Cd, Cr, Cu, Pb, Hg, Ni, and Zn), pesticides/PCBs, oil and grease, ammonia, total organic carbon (TOC), and phenols. The methods used included:

Metal - By U.S. EPA (1986) Method 3050, which includes acid digestion followed by atomic absorption.

Pesticides and PCBs - By U.S. EPA (1986) Method 8080, which includes solvent extraction, column cleanup and quantification by GC-ECD.

Oil and Grease - By Standard Methods 502 (1975), which includes solvent extraction and quantification by infrared spectrophotometry.

Ammonia - By Standard Methods 417 (1975), which includes distillation and titration.

TOC - Standard Method 505 (1975), which includes combustion of sediment and quantification by infrared absorption.

PAH - By U.S. EPA (1986) Method 8100, which includes solvent extraction, column clean-up, and quantification by GC-FID.

Phenols - By U.S. EPA (1986) Method 8040, which includes solvent extraction, column clean-up and quantification by GC-FID.

Pentachlorophenol - By U.S. EPA (1986) Method 8150, which includes derivatization and analysis by GC-ECD.

For quality assurance (QA) surrogates were added to the sediments analyzed for organic compounds. The surrogate recoveries for pesticides and PCBs were in the range of 98% to 100% for PAHs, the range was 78% to 83%, and for phenols, including pentachlorophenol, the range was 34% to 127%.

The chemical results on the enclosed table are typical of uncontaminated marine sediments. None of the organic compounds were detected. The concentrations of metals, oil and grease, TOC, and ammonia are also typical of clean estuarine sediment with a moderate level of organic matter. There is no indication these sediments would be toxic to organisms.

If I can be of additional assistance to your organization, please call me at 206/683-4151.

Sincerely,

Eric

Eric Crecelius
Senior Research Scientist

:at

Enclosure

Concentrations of Metals, Oil and Grease, TOC, and Ammonia Nitrogen in Umpqua River, Gardner Channel Sediment (February 1989)

Parameter	Units (dry wt)	UR-VC-1AA	UR-VC-2A
As	µg/g	18.1	17.3
Cd	µg/g	<0.11	<0.22
Cr	µg/g	53.9	61.6
Cu	µg/g	33.5	28.2
Pb	µg/g	3.1	4.9
Hg	µg/g	<0.11	<0.11
Ni	µg/g	50.4	51.4
Zn	µg/g	70.1	70.8
Oil and Grease	µg/g	49.9	142
TOC	%	1.29	1.31
Ammonia as N	µg/g	92.1	134

Concentrations of Metals, Oil and Grease, TOC, and Ammonia Nitrogen in Umpqua River, Gardner Channel Sediment (February 1989)

Parameter	Units (dry wt)	UR-VC-1AA	UR-VC-2A
As	µg/g	18.1	17.3
Cd	µg/g	0.11	0.22
Cr	µg/g	53.9	61.6
Cu	µg/g	33.5	28.2
Pb	µg/g	3.1	4.9
Hg	µg/g	0.055	0.057
Ni	µg/g	50.4	51.4
Zn	µg/g	70.1	70.8
Oil and Grease	µg/g	49.9	142
TOC	%	1.29	1.31
Ammonia as N	µg/g	92.1	134

ORGANICS ANALYSIS DATA SHEET- PNA by GC-FID

Sample No: UR-VC-1A

Lab Sample ID: 2690 A
Matrix: Water

VTSR: 03/01/89

Date Extracted: 03/03/89
Date Analyzed: 03/08/89
Conc/Dil Factor: 1:2
Dry Weight Analyzed: 36.47 g

QC Report No: 2690-Battelle
Project: Q8800AB5

Data Release Authorized: Bryan D. Anderson

REPORT PREPARED: MAC:C - M.L. (03/13/89)

CAS Number		µg/Kg
91-20-3	Naphthalene	100 U
208-96-8	Acenaphthylene	100 U
83-32-9	Acenaphthene	100 U
86-73-7	Fluorene	100 U
85-01-8	Phenanthrene	100 U
120-12-7	Anthracene	100 U
206-44-0	Fluoranthene	100 U
129-00-0	Pyrene	100 U
56-55-3	Benzo(a)Anthracene	100 U
218-01-9	Chrysene	100 U
205-99-2 207-08-9	Benzo(b)Fluoranthene & Benzo(k)Fluoranthene	150 U
50-32-8	Benzo(a)Pyrene	150 U
193-39-5	Indeno(1,2,3-cd)Pyrene	250 U
53-70-3	Dibenz(a,h)Anthracene	250 U
191-24-2	Benzo(ghi)Perylene	300 U

SURROGATE PERCENT RECOVERY	
Terphenyl	78%

Data Qualifiers

U — Indicates compound was analyzed for but not detected at the given detection limit.

NA — Indicates compound not analyzed.

NR — Indicates compound not reported due to chromatographic interference and/or dilution.

ORGANICS ANALYSIS DATA SHEET- PNA by GC-FID

Sample No: UR-VC-2A

Lab Sample ID: 2690 B
Matrix: Water

VTSR: 03/01/89

Date Extracted: 03/03/89
Date Analyzed: 03/08/89
Conc/Dil Factor: 1:2
Dry Weight Analyzed: 42.48 g

QC Report No: 2690-Battelle
Project: Q8800AB5

Data Release Authorized: Bryan D. Anderson

REPORT PREPARED: MAC:C - M.L. (03/13/89)

CAS Number		µg/Kg
91-20-3	Naphthalene	100 U
208-96-8	Acenaphthylene	100 U
83-32-9	Acenaphthene	100 U
86-73-7	Fluorene	100 U
85-01-8	Phenanthrene	100 U
120-12-7	Anthracene	100 U
206-44-0	Fluoranthene	100 U
129-00-0	Pyrene	100 U
56-55-3	Benzo(a)Anthracene	100 U
218-01-9	Chrysene	100 U
205-99-2 207-08-9	Benzo(b)Fluoranthene & Benzo(k)Fluoranthene	150 U
50-32-8	Benzo(a)Pyrene	150 U
193-39-5	Indeno(1,2,3-cd)Pyrene	250 U
53-70-3	Dibenz(a,h)Anthracene	250 U
191-24-2	Benzo(ghi)Perylene	300 U

SURROGATE PERCENT RECOVERY	
Terphenyl	83%

Data Qualifiers

U	Indicates compound was analyzed for but not detected at the given detection limit.
NA	Indicates compound not analyzed.
NR	Indicates compound not reported due to chromatographic interference and/or dilution.

ORGANICS ANALYSIS DATA SHEET - PESTICIDE/PCB

Sample No. UR-VC-1AA

Lab Sample ID: 2690 A
Matrix: Soil
VTSR: 02/24/89

Date Extracted: 03/03/89
Date Analyzed: 03/08/89
Conc/Dil Factor: 1:20
Dry Weight: 36.47 g

QC Report No.: 2690-Battelle
PROJECT: Q8800AB5
GPC Cleanup: YES
Alumina Cleanup: YES

Data Release Authorized:

DATA PREPARED: MAC:C-M.L. (03/10/89)

CAS Number		µg/Kg
319-84-6	Alpha-BHC	2.0 U
319-85-7	Beta-BHC	2.0 U
319-86-8	Delta-BHC	2.0 U
58-89-9	Gamma-BHC (Lindane)	2.0 U
76-44-8	Heptachlor	2.0 U
309-00-2	Aldrin	2.0 U
1024-57-3	Heptachlor Epoxide	2.0 U
959-98-8	Endosulfan I	2.0 U
60-57-1	Dieldrin	3.0 U
72-55-9	4,4'-DDE	3.0 U
72-20-8	Endrin	3.0 U
33212-65-9	Endosulfan II	3.0 U
72-54-8	4,4'-DDD	6.0 U
1031-07-8	Endosulfan Sulfate	6.0 U
50-29-3	4,4'-DDT	4.0 U
72-43-5	Methoxychlor	8.0 U
53494-70-5	Endrin Ketone	3.0 U
5103-74-2	Gamma-Chlordane	2.0 U
5103-71-9	Alpha-Chlordane	2.0 U
8001-35-2	Toxaphene	300 U
-	Aroclor-1242/1016	40 U
12672-29-6	Aroclor-1248	40 U
11097-69-1	Aroclor-1254	40 U
11096-82-5	Aroclor-1260	40 U

* Pesticide Surrogate Recovery	
Dibutylchlorendate	98%

Data Qualifiers

U — Indicates compound was analyzed for but not detected at the given detection limit.

J — Indicates a hit below the calculated detection limit but considered real by the analyst.

ORGANICS ANALYSIS DATA SHEET - PESTICIDE/PCB

Sample No. UR-VC-2A

Lab Sample ID: 2690 B
Matrix: Soil
VTSR: 02/24/89

Date Extracted: 03/03/89
Date Analyzed: 03/08/89
Conc/Dil Factor: 1:20
Dry Weight: 42.45 g

QC Report No.: 2690-Battelle
PROJECT: Q8800AB5
GPC Cleanup: YES
Alumina Cleanup: YES

Data Release Authorized: _____

DATA PREPARED: MAC:C-M.L. (03/10/89)

CAS Number		µg/Kg
319-84-6	Alpha-BHC	2.0 U
319-85-7	Beta-BHC	2.0 U
319-86-8	Delta-BHC	2.0 U
58-89-9	Gamma-BHC (Lindane)	2.0 U
76-44-8	Heptachlor	2.0 U
309-00-2	Aldrin	2.0 U
1024-57-3	Heptachlor Epoxide	2.0 U
959-98-8	Endosulfan I	2.0 U
60-57-1	Dieldrin	3.0 U
72-55-9	4,4'-DDE	3.0 U
72-20-8	Endrin	3.0 U
33212-65-9	Endosulfan II	3.0 U
72-54-8	4,4'-DDD	6.0 U
1031-07-8	Endosulfan Sulfate	6.0 U
50-29-3	4,4'-DDT	4.0 U
72-43-5	Methoxychlor	8.0 U
53494-70-5	Endrin Ketone	3.0 U
5103-74-2	Gamma-Chlordane	2.0 U
5103-71-9	Alpha-Chlordane	2.0 U
8001-35-2	Toxaphene	300 U
-	Aroclor-1242/1016	40 U
12672-29-6	Aroclor-1248	40 U
11097-69-1	Aroclor-1254	40 U
11096-82-5	Aroclor-1260	40 U

* Pesticide Surrogate Recovery	
Dibutylchlorendate	100%

Data Qualifiers

U — Indicates compound was analyzed for but not detected at the given detection limit.

J — Indicates a hit below the calculated detection limit but considered real by the analyst.

ORGANIC ANALYISIS DATA SHEET - PCP

Client: Battelle Northwest

Data Release Authorized:

QC Report No: 2690

Report prepared on MAC: C 03/20/89 jv

Project: Q8800AB5

Sample ID:	Method Blk.	UR-VC-1AA	UR-VC-2A
ARI ID:	2690 MB	2690 A	2690 B
Amount Extracted:	3.16 g.	2.88 g.	3.43 g.
VTSR:	NA	03/01/89	03/01/89
Date Extracted:	03/16/89	03/16/89	03/16/89
Date Analyzed:	03/17/89	03/17/89	03/17/89
Dilution:	1 to 25	1 to 25	1 to 25
Units:	µg/Kg	µg/Kg	µg/Kg
PCP	4.0 U	4.0 U	4.0 U

* Surrogate Percent Recovery

Bromodichlorophenol	80%	127%	110%

Data Qualifiers

U — *Indicates compound was analyzed for but not detected at the given detection limit.*

J — *Indicates a hit below the calculated detection limit but considered real by the analyst.*

ORGANICS ANALYSIS DATA SHEET - PHENOLS SCREEN by GC/FID

Sample No: UR-VC-1AA

Lab Sample ID: 2690 A
Matrix: Soil
VTSR: 03/01/89

Date Extracted: 03/03/89
Date Analyzed: 03/09/89
Conc/Dil Factor: 1:2
Dry Weight Analyzed: 36.47 g

QC Report No.: 2690-Battelle
Project: Q8800AB5

Data Release Authorized: _____ *DATA PREPARED: MAC:C - M.L. (03/10/89)*

CAS Number		µg/Kg
108-95-2	Phenol	250 U
95-57-8	2-Chlorophenol	380 U
95-48-7	2-Methylphenol	200 U
106-44-5	4-Methylphenol	250 U
88-75-5	2-Nitrophenol	380 U
51-28-5	2,4-Dinitrophenol	200 U
120-83-2	2,4-Dichlorophenol	400 U
59-50-7	4-Chloro-3-methylphenol	400 U
88-06-2	2,4,6-Trichlorophenol	700 U
95-95-0	2,4,5-Trichlorophenol	750 U

SURROGATE RECOVERY	
GUAIACOL	34%

DATA QUALIFIERS

U — Indicates compound was analyzed for but not detected at the given detection limit.

J — Indicates a hit below the calculated detection limit but considered real by the analyst.

NC — Indicates a tentative hit not confirmed on a second column due to interference.

ORGANICS ANALYSIS DATA SHEET - PHENOLS SCREEN by GC/FID

Sample No: UR-VC-2A

Lab Sample ID: 2690 B
Matrix: Soil
VTSR: 03/01/89

Date Extracted: 03/03/89
Date Analyzed: 03/09/89
Conc/Dil Factor: 1:2
Dry Weight Analyzed: 42.45 g

QC Report No.: 2690-Battelle
Project: Q8800AB5

Data Release Authorized: _____ *DATA PREPARED: MAC:C - M.L. (03/10/89)*

CAS Number		µg/Kg
108-95-2	Phenol	250 U
95-57-8	2-Chlorophenol	380 U
95-48-7	2-Methylphenol	200 U
106-44-5	4-Methylphenol	250 U
88-75-5	2-Nitrophenol	380 U
51-28-5	2,4-Dinitrophenol	200 U
120-83-2	2,4-Dichlorophenol	400 U
59-50-7	4-Chloro-3-methylphenol	400 U
88-06-2	2,4,6-Trichlorophenol	700 U
95-95-0	2,4,5-Trichlorophenol	750 U

SURROGATE RECOVERY	
GUAIACOL	48%

DATA QUALIFIERS

U — Indicates compound was analyzed for but not detected at the given detection limit.

J — Indicates a hit below the calculated detection limit but considered real by the analyst.

NC — Indicates a tentative hit not confirmed on a second column due to interference.

ORGANICS ANALYSIS DATA SHEET- PNA by GC-FID

Sample No: Method Blank

Lab Sample ID: 2690 MB
Matrix: Water

VTSR: 03/01/89

Date Extracted: 03/03/89
Date Analyzed: 03/08/89
Conc/Dil Factor: 1:2
Dry Weight Analyzed: 40.00 g

QC Report No: 2690-Battelle
Project: Q8800AB5

REPORT PREPARED: MAC:C - M.L. (03/13/89)

Data Release Authorized: Bryan D. Anderson

CAS Number		µg/Kg
91-20-3	Naphthalene	100 U
208-96-8	Acenaphthylene	100 U
83-32-9	Acenaphthene	100 U
86-73-7	Fluorene	100 U
85-01-8	Phenanthrene	100 U
120-12-7	Anthracene	100 U
206-44-0	Fluoranthene	100 U
129-00-0	Pyrene	100 U
56-55-3	Benzo(a)Anthracene	100 U
218-01-9	Chrysene	100 U
205-99-2 207-08-9	Benzo(b)Fluoranthene & Benzo(k)Fluoranthene	150 U
50-32-8	Benzo(a)Pyrene	150 U
193-39-5	Indeno(1,2,3-cd)Pyrene	250 U
53-70-3	Dibenz(a,h)Anthracene	250 U
191-24-2	Benzo(ghi)Perylene	300 U

SURROGATE PERCENT RECOVERY	
Terphenyl	77%

Data Qualifiers

U — Indicates compound was analyzed for but not detected at the given detection limit.

NA — Indicates compound not analyzed.

NR — Indicates compound not reported due to chromatographic interference and/or dilution.

ORGANICS ANALYSIS DATA SHEET - PESTICIDE/PCB

Sample No. Method Blank

Lab Sample ID: 2690 MB
Matrix: Soil
VTSR: 02/24/89

Date Extracted: 03/03/89
Date Analyzed: 03/08/89
Conc/Dil Factor: 1:20
Dry Weight: 40.00 g

QC Report No.: 2690-Battelle
PROJECT: Q8800AB5
GPC Cleanup: YES
Alumina Cleanup: YES

Data Release Authorized:

DATA PREPARED: MAC:C-M.L. (03/10/89)

CAS Number		µg/Kg
319-84-6	Alpha-BHC	2.0 U
319-85-7	Beta-BHC	2.0 U
319-86-8	Delta-BHC	2.0 U
58-89-9	Gamma-BHC (Lindane)	2.0 U
76-44-8	Heptachlor	2.0 U
309-00-2	Aldrin	2.0 U
1024-57-3	Heptachlor Epoxide	2.0 U
959-98-8	Endosulfan I	2.0 U
60-57-1	Dieldrin	3.0 U
72-55-9	4,4'-DDE	3.0 U
72-20-8	Endrin	3.0 U
33212-65-9	Endosulfan II	3.0 U
72-54-8	4,4'-DDD	6.0 U
1031-07-8	Endosulfan Sulfate	6.0 U
50-29-3	4,4'-DDT	4.0 U
72-43-5	Methoxychlor	8.0 U
53494-70-5	Endrin Ketone	3.0 U
5103-74-2	Gamma-Chlordane	2.0 U
5103-71-9	Alpha-Chlordane	2.0 U
8001-35-2	Toxaphene	300 U
-	Aroclor-1242/1016	40 U
12672-29-6	Aroclor-1248	40 U
11097-69-1	Aroclor-1254	40 U
11096-82-5	Aroclor-1260	40 U

* Pesticide Surrogate Recovery	
Dibutylchlorendate	84%

Data Qualifiers

U — Indicates compound was analyzed for but not detected at the given detection limit.

J — Indicates a hit below the calculated detection limit but considered real by the analyst.

ORGANICS ANALYSIS DATA SHEET - PHENOLS SCREEN by GC/FID

Sample No: Method Blank

Lab Sample ID: 2690 MB
Matrix: Soil
VTSR: 03/01/89

Date Extracted: 03/03/89
Date Analyzed: 03/09/89
Conc/Dil Factor: 1:2
Dry Weight Analyzed: 40.00 g

QC Report No.: 2690-Battelle
Project: Q8800AB5

Data Release Authorized: _____ *DATA PREPARED: MAC:C - M.L. (03/10/89)*

CAS Number		µg/Kg
108-95-2	Phenol	250 U
95-57-8	2-Chlorophenol	380 U
95-48-7	2-Methylphenol	200 U
106-44-5	4-Methylphenol	250 U
88-75-5	2-Nitrophenol	380 U
51-28-5	2,4-Dinitrophenol	200 U
120-83-2	2,4-Dichlorophenol	400 U
59-50-7	4-Chloro-3-methylphenol	400 U
88-06-2	2,4,6-Trichlorophenol	700 U
95-95-0	2,4,5-Trichlorophenol	750 U

SURROGATE RECOVERY	
GUAIACOL	48%

DATA QUALIFIERS

U — Indicates compound was analyzed for but not detected at the given detection limit.

J — Indicates a hit below the calculated detection limit but considered real by the analyst.

NC — Indicates a tentative hit not confirmed on a second column due to interference.